



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/027,592	12/19/2001	Tony P. Chiang	M-11466-8C US	1875

7590 06/17/2003

Brian D. Ogonowksy
Patent Law Group
2635 North First Street
Suite 223
San Jose, CA 95134-2049

EXAMINER

FULLER, ERIC B

ART UNIT

PAPER NUMBER

1762

DATE MAILED: 06/17/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/027,592

Applicant(s)

CHIANG ET AL.

Examiner

Eric B Fuller

Art Unit

1762

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 March 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

Art Unit: 1762

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-19, 21, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sherman (US 6,342,277 B1) in view of Gruenwald et al. (US 5,009,738).

Sherman teaches a process where a vacuum evacuates a process chamber, an atomic layer deposition gas is fed into a process chamber, the chamber is evacuated again, a second reactive gas is supplied to the chamber, and the process cycle is completed with another evacuation (figure 2; column 5, lines 5-30). It is taught that the exhaust valve is open during evacuation and closed during the gas feeding steps (column 6, lines 28-40). This reads on varying the conductance of the exit gas by varying the restriction through which the gas exits the chamber. This valve also inherently would cause the flux and pressure of the feed steps to vary from the flux and pressure of the exhausting steps. The reactive gas is activated by a plasma discharge (column 12, lines 62) from an RF source (column 6, line 24), such that it includes ions and reactive atoms. It is taught that the exhausting steps are performed by evacuating the chamber while flowing non-activated reactive gas (column 7, lines 55-67), which

Art Unit: 1762

reads on purging. Figure 2 shows that the gas flows, when flowing, are constant. The reference fails to teach that moving a restriction device within the chamber varies the conductance of the exhaust gas.

However, Gruenwald teaches a perforated plate that is rotated above the exhaust openings of a vapor processing chamber (column 7, lines 1-10; column 4, lines 26-33). The plate controls the conductance of the exhaust gases so that important parameters such as dwell times may be accurately controlled. Therefore, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to use the perforated disk in the chamber of Sherman to vary the conductance of the exhaust gas as required. By doing so, parameters such as dwell time may be accurately controlled.

As to claims 5 and 6, although the reference does not explicitly teach that the pressure and flux of the chamber vary inversely with the conductance of the exhaust, it is the position of the examiner that this is an inherent phenomenon.

As to newly added claims 21 and 22, figure 3 of Gruenwald shows how a portion of the bottom wall is moved such that the cross area of the gas exit openings are increased and decreased.

Claims 1, 2, 4-8, 10, 14, 17-19, 21, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suntola et al. (US 4,413,022) in view of Suzuki (US 2001/0048981 A1) and Gruenwald et al. (US 5,009,738).

Art Unit: 1762

Suntola teaches a method of fabricating a thin film on a substrate by using atomic layer deposition (column 1, lines 35-51). As the first reagent gas, or stream of reactive atoms, is flowed into the chamber, the pressure is increased and held at a certain pressure. The pressure is then allowed to drop as the first reagent is purged. As the second reagent is flowed into the chamber, the pressure is allowed to rise again to a constant amount. The cycle is completed with a purging at reduced pressure again (figure 1; column 4, lines 1-52). It is the examiners position that as one varies the pressure, the flux is varied as well. The reference fails to teach these pressure/flux changes as being controlled by exit conductance.

However, Senzaki teaches a process where pressure is varied in a chamber. It is taught that controlling the conductance of the exhaust system, while keeping the inflow constant, controls the pressure (0030). Therefore, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to perform the pressure changes of Suntola by leaving the mass of the inflow constant and adjusting the conductance of the exhaust stream. By doing so, one would have a reasonable expectation of success. The combined references fail to teach that moving a restriction device within the chamber varies the conductance of the exhaust gas.

However, Gruenwald teaches a perforated plate that is rotated above the exhaust openings of a vapor processing chamber (column 7, lines 1-10; column 4, lines 26-33). The plate controls the conductance of the exhaust gases so that important parameters such as dwell times may be accurately controlled. Therefore, it would have been obvious at the time the invention was made to a person having ordinary skill in the

Art Unit: 1762

art to use the perforated disk in the chamber of Suntola to vary the conductance of the exhaust gas as required. By doing so, parameters such as dwell time may be accurately controlled.

Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Suntola et al. (US 4,413,022) in view of Suzuki (US 2001/0048981 A1) and Tanaka (US 5,091,207).

Suntola in view of Suzuki teaches the limitations as shown above, but fails to teach that varying the restriction of the gas flowing through the exhaust controls the conductance.

However, Tanaka teaches valves that restrict the flow of exhaust gas in order to control the conductance (column 4, lines 30-66). Therefore, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to utilize the valve of Tanaka to restrict the gas flow of Suntola and Suzuki. By doing so, one would have a reasonable expectation of varying the pressure of Suntola. To perform the process in the apparatus of Tanaka would have been obvious at the time the invention was made to a person having ordinary skill in the art as it provides a more uniform flow through the chamber (column 6, lines 24-26). The valves are on the periphery of the chamber, and hence define it, and act as shields as they act to block gas flow. Therefore, the valves of Tanaka read on the limitations of claim 20.

Art Unit: 1762

Claims 3, 9, 11-13, 15, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suntola et al. (US 4,413,022) in view of Suzuki (US 2001/0048981 A1) and Gruenwald et al. (US 5,009,738), as applied to claims 1 and 7 above, and further in view of Sherman (US 6,342,277 B1).

It has been shown above that the combination of Suntola, Suzuki, and Gruenwald teaches the limitations of claims 1 and 7. These references fail to teach that the reactive gas is plasma from an RF source. However, Sherman teaches that using plasma as the reactive gas allows for quicker deposition times (column 7, lines 35-65). Therefore, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to utilize plasma in the process of Suntola, with the modifications made obvious by Suzuki and Gruenwald. By doing so, deposition times are reduced. An RF source ignites the plasma (column 6, line 24).

Double Patenting

Claims 1-22 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 58-75 of copending Application No. 09/902,080. Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims in application 09/902,080 includes to create a pressure differential between the chamber and the outside area. Although this is not explicitly claimed in claim 1 of the present invention, it would have been obvious at the time the invention was made to a person having ordinary skill in the art.

Art Unit: 1762

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Response to Arguments

Applicant argues that the references of the prior Office Action fail to teach the limitation of moving a restriction device within the chamber in order to control the conductance of the exhaust gas, as has been added by amendment. Examiner agrees and has withdrawn the rejections accordingly. Applicant's arguments are moot in view of the new grounds of rejection that has been applied in the present Office Action.

Applicant argues that Tanka fails to teach "moving a shield defining a periphery of the chamber", as Tanka teaches multiple valves situated around the chamber. This argument is found unpersuasive. This limitation, as written, is vague and open to numerous interpretations as to what constitutes a "shield". Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). The valves, as they act to keep gas from flowing out of the chamber, read on being a shield. The valves, being situated around the chamber, act to define a periphery of the chamber.

Art Unit: 1762

Examiner acknowledges the Applicant's desire to postpone the filing of a terminal disclaimer until the details of this and the corresponding case have been worked out. The rejection is repeated as it is still pertinent to the claims as amended.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eric B Fuller whose telephone number is (703) 308-6544. The examiner can normally be reached on Mondays through Thursdays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive Beck, can be reached on (703) 308-2333. The fax phone numbers

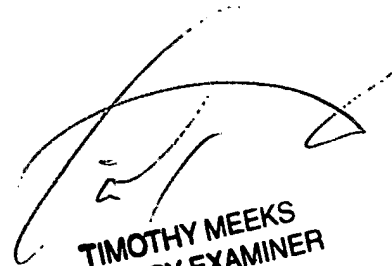
Art Unit: 1762

for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.



EBF
June 12, 2003



TIMOTHY MEEKS
PRIMARY EXAMINER